

**ATTENUATED HUMAN-BOVINE CHIMERIC PARAINFLUENZA VIRUS (PIV)
VACCINES****ABSTRACT OF THE DISCLOSURE**

5 Chimeric human-bovine parainfluenza viruses (PIVs) are infectious and
attenuated in humans and other mammals and useful individually or in combination in
vaccine formulations for eliciting an anti-PIV immune response. Also provided are isolated
polynucleotide molecules and vectors incorporating a chimeric PIV genome or antigenome
which includes a partial or complete human or bovine PIV "background" genome or
10 antigenome combined or integrated with one or more heterologous gene(s) or genome
segment(s) of a different PIV. Chimeric human-bovine PIV of the invention include a partial
or complete "background" PIV genome or antigenome derived from or patterned after a
human or bovine PIV virus combined with one or more heterologous gene(s) or genome
segment(s) of a different PIV virus to form the human-bovine chimeric PIV genome or
15 antigenome. In certain aspects of the invention, chimeric PIV incorporate a partial or
complete human PIV background genome or antigenome combined with one or more
heterologous gene(s) or genome segment(s) from a bovine PIV, whereby the resultant
chimeric virus is attenuated by virtue of host-range restriction. In alternate embodiments,
human-bovine chimeric PIV incorporate a partial or complete bovine PIV background
20 genome or antigenome combined with one or more heterologous gene(s) or genome
segment(s) from a human PIV gene that encode a human PIV immunogenic protein, protein
domain or epitope, for example encoded by PIV HN and/or F glycoprotein gene(s) or genome
segment(s). Human-bovine chimeric PIV of the invention are also useful as vectors for
developing vaccines against other pathogens. A variety of additional mutations and
25 nucleotide modifications are provided within the human-bovine chimeric PIV of the
invention to yield desired phenotypic and structural effects.